CLAIMS

What is claimed is:

1. A turbofan with a drive motor, comprising:

a rotating plate joined to a shaft of the drive motor;

an outer ring concentrically disposed outside of the rotating plate with a spacing therebetween;

a plurality of blades radially arranged on peripheral portion of a front face of the rotating plate and integrally connected at rear ends thereof to the rotating plate and the outer ring; and

a ring-shaped shroud integrally formed with front ends of the plurality of blades.

2. The turbofan as set forth in claim 1, wherein an external diameter of the rotating plate is equal to or smaller than an internal diameter of the ring-shaped shroud.

3. The turbofan as set forth in claim 1, wherein an internal diameter of the outer ring is equal to or larger than an external diameter of the ring-shaped shroud.

4. The turbofan as set forth in claim 1, wherein each of the blades is integrally formed with the rotating plate and the outer ring at opposite ends of a rear portion of each of the plurality of blades.

5. A mold to manufacture a turbofan including a rotating plate joined to a shaft of a drive motor, an outer ring concentrically disposed outside of the rotating plate with a spacing therebetween, a plurality of blades radially arranged on a peripheral portion of a front face of the rotating plate and integrally connected at rear ends thereof to the rotating plate and the outer ring, and a ring-shaped shroud integrally formed with front ends of the blades, the mold comprising:

a first mold half including:

a first front molding part to form a front face of the rotating plate,

a second front molding part concentrically disposed outside of the first front molding part to form a front face of the ring-shaped shroud, and

a third front molding part concentrically disposed outside of the second front molding part to form a front face of the outer ring; and

a second mold half to combine with the first mold half, and including:

a first rear molding part disposed at a center of the second mold half to form a rear face of the rotating plate,

a plurality of second rear molding parts concentrically disposed outside of the first rear molding part and having shapes corresponding to spaces between the plurality of blades to form a rear face of the ring-shaped shroud and the plurality of blades, and

a third rear molding part concentrically disposed outside of the plurality of second rear molding parts to form a rear face of the outer ring.

6. The mold as set forth in claim 5, wherein the first mold half further includes a plurality of inner molding grooves formed outside of the first front molding part, which extends in an inward direction beyond an internal diameter of the ring-shaped shroud so as to mold inner ends of respective blades.

7. The mold as set forth in claim 5, wherein the first mold half further includes a plurality of outer molding grooves formed inside of the third front molding part, which extends in an outward direction beyond an external diameter of the ring-shaped shroud, so as to mold outer ends of respective blades.

8. The mold as set forth in claim 5, wherein the surface of the second front molding part corresponding to the front face of the ring-shaped shroud forms a front concave face of the ring-shaped shroud.

9. The mold as set forth in claim 5, wherein when the first and second mold halves are combined with each other, the second rear molding parts of the second mold half are moved close to the second front molding part of the first mold half and occupy respective spaces defined between the plurality of blades of the turbofan with a gap corresponding to a thickness of the ring-shaped shroud.

10. The mold as set forth in claim 5, wherein the second rear molding parts of the second mold half are removable from the first mold half through the spacing between the rotating plate and the outer ring.

11. A turbofan, comprising:

a rotating plate to rotate in the turbofan;

an outer ring concentrically disposed outside of the rotating plate with a spacing between the outer ring and the rotating plate;

a plurality of blades radially arranged at the spacing between the outer ring and the rotating plate, each of the plurality of blades being integrally connected at a rear portion of a respective blade to each of the rotating plate and of the outer ring; and

a shroud integrally formed with front ends of the plurality of blades.

12. The turbofan as set forth in claim 8, wherein the shroud is ring-shaped and the rotating plate is circular such that an external diameter of the rotating plate is equal to or smaller than an internal diameter of the ring-shaped shroud.

13. The turbofan as set forth in claim 8, wherein the shroud is ring-shaped such that an internal diameter of the outer ring is equal to or larger than an external diameter of the ring-shaped shroud.

14. The turbofan as set forth in claim 8, wherein each of the blades is integrally formed with the rotating plate and the outer ring at opposite ends of a rear portion of each of the plurality of blades.

15. The turbofan as set forth in claim 8, wherein the spacing between the rotating plate and the outer ring is a uniform annular spacing.

16. The turbofan as set forth in claim 8, wherein a radial width of each of the plurality of blades is larger than a radial width of the spacing between the rotating plate and the outer ring.

17. The turbofan as set forth in claim 8, wherein a center of the circular rotating plate protrudes forward into a dome shape.

18. The turbofan as set forth in claim 8, wherein each of the plurality of blade are inclined at a common angle with respect to a radial direction of a respective blade.

19. The turbofan as set forth in claim 8, wherein the ring-shaped shroud is curled at an inner peripheral portion thereof to have a specific curvature.

20. The turbofan as set forth in claim 8, wherein each of the plurality of blades comprises:

inner and outer ends such that the rotating plate and the outer ring are integrally molded via the plurality of blades by the inner and outer ends of the plurality of blades, the inner and outer ends being extending portions of the plurality of blades.

21. A method to manufacture a turbofan having:

a rotating plate joined to a shaft of a drive motor, an outer ring concentrically disposed outside of the rotating plate with a spacing therebetween, a plurality of blades radially arranged on a peripheral portion of a front face of the rotating plate and integrally connected at rear ends thereof to the rotating plate and the outer ring, and a ring-shaped shroud integrally formed with front ends of the blades by a mold comprising:

a first mold half including a first front molding part to form a front face of the rotating plate, a second front molding part concentrically disposed outside of the first front molding part to form a front face of the ring-shaped shroud, and a third front molding part concentrically disposed outside of the second front molding part to form a front face of the outer ring; and

a second mold half to combine with the first mold half, and including a first rear molding part disposed at a center of the second mold half to form a rear face of the rotating plate, a plurality of second rear molding parts concentrically disposed outside of the first rear molding part and having shapes corresponding to spaces between the plurality of blades to form a rear face of the ring-shaped shroud and the plurality of blades, and a third rear molding part concentrically disposed outside of the plurality of second rear molding parts to form a rear face of the outer ring, the method comprising:

integrally producing the turbofan by:

combining the first and second mold halves; and

injecting molten resin to fill a molding space within the combined first and second mold halves.